

INTEGRALS OF EXPONENTIAL FUNCTIONS
AP CALCULUS

Answers
NAME _____

Find the indefinite integral.

1. $\int 5e^{5x} dx$

$$F(x) = e^{5x} + C$$

2. $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

$$F(x) = 2e^{\sqrt{x}} + C$$

3. $\int \frac{e^{-x}}{1+e^{-x}} dx$

$$F(x) = -\ln|1+e^{-x}| + C$$

4. $\int e^x \sqrt{1-e^x} dx$

$$F(x) = -\frac{2}{3}(1-e^x)^{3/2} + C$$

5. $\int \frac{e^x + e^{-x}}{e^x - e^{-x}} dx$

$$F(x) = \ln|e^x - e^{-x}| + C$$

6. $\int \frac{5-e^x}{e^{2x}} dx$

$$F(x) = -\frac{5}{2}e^{-2x} + e^{-x} + C$$

7. $\int e^{-x} \tan(e^{-x}) dx$

$$F(x) = -\ln|\cos e^{-x}| + C$$

Evaluate the definite integral.

$$8. \int_0^5 e^x dx$$

$$e^5 - 1$$

$$9. \int_0^1 e^{-2x} dx$$

$$\frac{e^2 - 1}{2e^2}$$

$$10. \int_0^1 xe^{-x^2} dx$$

$$\frac{e-1}{2e}$$

$$11. \int_1^3 \frac{e^{3/x}}{x^2} dx$$

$$\frac{e^3 - e}{3}$$

$$12. \int_0^{\pi/2} e^{\sin x} \cos x dx$$

$$\frac{1}{\pi} (e^{\sin \frac{\pi}{2}} - 1)$$

$$13. \int_0^{\sqrt{6}} xe^{-x^2/4} dx$$

$$-2(e^{-3/2} - 1)$$

Solve the differential equation.

$$14. \frac{dy}{dx} = xe^{ax^2}$$

$$y = \frac{1}{2a} e^{ax^2} + C$$

Find the particular solution that satisfies the initial condition.

$$15. f''(x) = \frac{1}{2}(e^x + e^{-x}); f(0) = 1; f'(0) = 0$$

$$f(x) = \frac{1}{2}(e^x + e^{-x})$$